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THE BENEFITS OF CENTER-BASED CARE AND FULL-DAY KINDERGARTEN  
FOR SCHOOL ATTENDANCE IN THE EARLY GRADES

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### **Abstract**

*Background:* School absenteeism has been recognized as a growing issue in the United States, especially during the early elementary school years when it is most pervasive. Accordingly, there has been growing interest in understanding why children are absent and whether certain early educational experiences can reduce children's rates of school absences.

*Objective:* The objective of this investigation was to estimate the additive and multiplicative benefits of children's early school experiences in preschool (center-based care) and kindergarten (center-based care and full day kindergarten enrollment) for patterns of school absenteeism in kindergarten and first grade.

*Methods:* To address these objectives, data were drawn from the Early Childhood Longitudinal Study Kindergarten Class of 2010-2011 and included 12,835 children and families.

*Results:* Children who attended center-based care in preschool and kindergarten had fewer missed school days and were less likely to be chronically absent in kindergarten and first grade. Children in full-day kindergarten programs had more absences by the end of kindergarten, but fewer absences by the end of the following year. No specific combination of early school arrangements was most beneficial. Instead, children who experienced more early educational arrangements were generally absent less frequently and these benefits were larger in first grade than in kindergarten.

*Conclusions:* When taken together, findings underscore the importance of formal early educational programs and opportunities on longer-term school attendance.

*Keywords:* Absenteeism; center-based care; full-day kindergarten; ECLS-K: 2011

Developmental and educational researchers have now shown what most parents and teachers have believed to be true about missing school: school truancy cripples the growth and development of our nation's schoolchildren (Alexander, Entwisle, & Horsey, 1997; Ansari, 2017, 2018; Arbour et al., 2016; Connolly & Olson, 2012; Dryfoos, 1990; Ehrlich, Gwynne, & Allensworth, 2018; Finn, 1993; Gottfried, 2009, 2011a, 2011b, 2013; Morrissey, Hutchison, & Winsler, 2014; Rumberger, 1995). Contrary to what many believe, however, missing school is not simply the act of teenagers 'ditching' class in middle school or high school. Rather, this behavior starts early in children's educational careers and persists over time: Chang and Davis (2015) found that in any given year, 10% of all kindergartners and first graders in the United States are missing at least 10% of the school year, which means they are chronically absent (Balfanz & Byrnes, 2012). An additional 14% of all kindergartners in the United States were also considered to be at-risk absentees, meaning they missed only one to six days fewer than the amount that would have classified them as chronic absentees (Romero & Lee, 2007).

Thus, roughly a quarter of our nation's students are chronically absent or just shy of being classified as such at the very start of their formal educational careers. Such high rates of school absenteeism requires greater scrutiny and, at the same time, presents a window of opportunity for intervention. After all, interventions targeting the early years hold greater promise than investments later in the life course (Heckman, 2008). That is, by intervening with regards to absenteeism at the very start of schooling, we might be able to help our nation's youngest students develop positive habits and strategies around going-to and attending school. If successful, this type of early-schooling intervention could have cascading effects by reducing a plethora of short- and long-term negative academic, health, and social outcomes for students and mitigating substantial moral and financial costs to society.

Our study contributes to the research in this regard – we focus on the role of early school settings. In the present study, we consider three types of early school settings. We define each here. The first two include center-based care in the year before kindergarten and during kindergarten, which include state-funded pre-K programs, center-based care programs that span across local, individual, and national chains, and Head Start, which represents that nation’s largest federally funded preschool program (see also: Ansari, 2018; Tucker-Drob, 2012). The third arrangement of interest is children’s enrollment in full-day kindergarten, which is in contrast to part- or half-day programs (AM or PM classes; see also: Votruba-Drzal, Li-Grining, & Maldonado-Carreno, 2008).

Some (but only very few) prior studies have examined the role of early school settings such as attending prekindergarten or full-day versus part-day kindergarten, as described in more detail below. However, each of these studies has examined these early school settings in isolation from one another. Therefore, each study, while important, provides only a partial picture on how early school settings contribute to or reduce student absenteeism. We are the first study to examine multiple early school settings in tandem. That is, this study delves into not only which early school settings matter for both the short- and long-term school absenteeism of our nation’s youngest schoolchildren, but also asks in what combination they might be most meaningful and if the frequency of enrollment matters. In doing so, our study provides a much richer portrait of support and risk as it relates to early school settings and absence behaviors.

### **School Absences during the Early Years**

Even though absenteeism is prevalent and detrimental throughout all years of formal schooling, it is alarmingly high in the earliest years (Balfanz & Byrnes, 2012; Romero & Lee, 2007) – hence underscoring the necessity to examine the role of early school settings. Research

specifically around absenteeism in early years has found negative effects of such behavior on a wide range of educational outcomes. For example, absenteeism as early as preschool and kindergarten has been found to result in lower academic test scores (Ansari & Purtell, 2017, 2018; Chang & Romero, 2008; Connolly & Olson, 2012; Ehrlich et al., 2018; Fuhs, Nesbitt, & Jackson, 2018; Gottfried, 2014a, 2017), less optimal social-behavioral development (Gottfried, 2014a), along with higher odds of grade retention and future absenteeism (Ansari & Purtell, 2018; Connolly & Olson, 2012).

While it is certainly true that much of the existing literature on absenteeism is based on associations, there has been some progress made in the last several years in terms of deriving a more causal link between school absences and the academic achievement for our nation's youngest children. For example, using an instrumental variables approach with distance to school, Gottfried (2010) found that children who attended school more frequently had a higher grade point average and scored higher on state standardized assessments. Gottfried (2011a) also used a family fixed effects design to identify variation in siblings' school absence patterns and found that those who were more frequently absent scored lower on assessments of academic achievement. Other educational scholars have also documented similar patterns across state datasets and at the national level when using classroom fixed effects as well as instrumental variables (Gershenson, Jacknowitz, & Brannegan, 2017; Goodman, 2014). Accordingly, when taken together, this body of research supports prior correlational claims that absences themselves can (and do) impede student's educational success, particularly at the start of elementary school.

### **Drivers of Early Absenteeism**

In light of this string of negative outcomes attributed to school absenteeism particularly in the early elementary school years, it is perhaps not surprising that many researchers have

attempted to identify both the antecedents of absenteeism and the mechanisms that might be linking absenteeism to later achievement as a means of mitigating its negative consequences. Informed by developmental and bioecological theory (Bronfenbrenner & Morris, 2006), a growing body of developmental and educational research illustrates that the underlying mechanisms as to why children are absent and/or chronically absent are multi-dimensional. That is, children's school attendance is shaped by factors that cut across various layers of the family, community, and school context. The literature geared at understanding the antecedents of early school absences, however, has generally explored individual characteristics of children themselves as well as the effects of their immediate home environments. Below, we discuss four broader mechanisms that are both of theoretical relevance and have been empirically shown to shape children's school absences during the early years, namely: individual child factors, family factors, school factors, and community factors.

First, at the individual level, children's health and well-being and their educational disengagement and alienation from school have been frequently linked to absenteeism (Bealing, 1990; deJung & Duckworth, 1986; Harte, 1994; Lehr, Sinclair, & Christenson, 2004; Reid, 1983). The second factor is the broader family ecology, such as family structure (e.g., household size, marital status) and families' socioeconomic status (e.g., occupation and income; Reid, 1982). As for the family, it is likely that this factor is linked to different rates of absenteeism due to availability in parental supervision (Sampson & Laub, 1994) and the time parents have to be engaged in their children's education (Ansari & Purtell, 2018; Catsambis & Beveridge, 2001; Fan & Chen, 2001; Jeynes, 2003; McNeal Jr., 1999; Muller, 1993). And, finally, as for families' socioeconomic status, Ready (2010) and Romero and Lee (2007) have shown that children from lower-income homes are more likely to be absent and chronically absent from school.

Moving beyond the family ecology and children's immediate experiences in the home, there is also evidence to suggest that other socio-contextual factors in the school, such as peers' academic, demographic, and behavioral characteristics also shape children's early school experiences (Gottfried, 2011b, 2013; Rothman, 2001) as do children's relations with their teachers, program interventions, and having health personnel located in the school (Allen, 2003; Bealing, 1990; Gehlbach et al., 2016; Gehlbach, Brinkworth, & Harris, 2012; Marvul, 2012). Finally, recent work by Gottfried (2014b) demonstrated that broader community systems, such as unemployment rates and neighborhood safety, also shaped student's school attendance. Thus, a number of underlying causes have been identified in the search for understanding why children miss time from school that go beyond student's health and well-being.

As exemplified here, most studies in the area of absenteeism have generally been grounded in bioecological models of development (Bronfenbrenner & Morris, 2006), but have been largely limited to studying contextual factors or processes while largely ignoring the role of children's early school experiences for their later school attendance. That is, our study addresses the fact that little is known about what early school settings/programs, namely participation in center-based care and full day kindergarten—which represent some of the very first opportunities children in the United States have in formal schooling—might influence school attendance for our youngest schoolchildren. This gap in the literature is somewhat surprising given the long-standing interest in how children's early education experiences might impact their long-term school success (Phillips et al., 2017; Yoshikawa et al., 2013).

Despite this lack of empirical inquiry that our study addresses, theory does suggest that educational experiences during the early years can help ease the transition to school by developing children's school outlook and routines (Ladd & Price, 1987), both of which are

linked with fewer instances of school absences (Gottfried, 2015; Ekstrom Goertz, Pollak, & Rock, 1986; Newmann, 1981). Participating in early schooling programs can also help establish and maintain school-going routines and logistics among parents, which also shape their children's school attendance (Chang & Romero, 2008; Gottfried, 2017). At the same time, however, some other research in this area suggests that children who have more extensive educational experiences during the early years may develop more negative attitudes toward school (due to, for instance, being away from home for a longer school day), which may, in turn, lead them to refuse to go to school more often (Gottfried, 2015). That is, children who have more extensive educational experiences early on, especially concurrently, may be less likely to be engaged in their education (for related work on child care multiplicity see: Morrissey, 2009; Piarz & Hill, 2014). Accordingly, although having received little attention in the existing literature, our study supports the notion that children's early school experiences in preschool and kindergarten can potentially shape their future school attendance.

### **Current Study**

To contribute to the research on the role of early schooling experiences on students' absences, we address the following research questions:

1. To what extent do early school experiences in prekindergarten and kindergarten reduce school absences in kindergarten and first grade? In particular:
  - a. Are children who attended center-based care in prekindergarten or before/after school during the kindergarten year less likely to be absent than children who experience informal care?
  - b. Are children who attended full-day kindergarten less likely to be absent than children who experience part-day kindergarten?

2. Are there particular combinations of early school experiences that are more (or less) likely to reduce children's likelihood of missing school? More specifically:
  - a. Are the benefits of full-day kindergarten and center-based care arrangement at ages 3 and 4 for children's absenteeism additive or multiplicative?

As part of this effort, and in order to isolate the associations between children's early school experiences and their school attendance, we also consider the other child and family correlates of school absenteeism. When taken together, we hypothesize that children who experience center-based care (in prekindergarten and/or before/after school during kindergarten) and full-day kindergarten will be absent *less* frequently than children who do not. Given the exploratory nature of our second objective, we do not make directional hypotheses about the multiplicative or additive benefits of children's educational arrangements for their school absences.

### **Method**

Data for the current investigation were drawn from the Early Childhood Longitudinal Study Kindergarten Class of 2010-2011 (ECLS-K: 2011; Tourangeau et al., 2014). The ECLS-K: 2011 included a nationally representative sample of approximately 18,760 children in kindergarten classrooms across 970 schools in the United States. To date, data have been collected from multiple informants including direct assessments of children as well as interviews with their parents, caregivers, and teachers. For the purposes of the current investigation, we used data from the surveys administered to parents and teachers and limited our sample to children who (a) participated through the end of first grade and (b) were considered to be a first time kindergartener (i.e., they were 4 years of age during the year prior and *not* eligible for kindergarten). The first exclusion criteria was required given our longitudinal analyses and we excluded children who were not first time kindergartners because their data on early childhood

arrangements would *not* align with children who were entering kindergarten for the first time (e.g., age 5 and age 6 versus age 4 and age 5). These exclusion criteria resulted in an analytic sample of 12,835 children (66.53 months of age at kindergarten entry; 51% male; 52% White, 13% Black, 25% Latino, 10% Asian/Other). For sample descriptives, see Table 1. Because this investigation is based on secondary data that are publicly available through the National Center for Educational Statistics, our research ethics committee declared this study exempt.

### Measures

**School absences.** During the spring of kindergarten and first grade, teachers were asked to “indicate the total number of absences for this child for the current school year.” Responses options were based on 6 point Likert scale (0 = *no absences*, 1 = *1 to 4 absences*, 2 = *5 to 7 absences*, 3 = *8 to 10 absences*, 4 = *11 to 19 absences*, and 5 = *20 or more absences*). To allow for a more meaningful interpretation of school absences, the scale values were recoded to equal the midpoint of the response options. For example, the scale value of 1 (i.e., 1 to 4 absences) was recoded as 2.5 absences and the scale value of 2 (i.e., 5 to 7 absences) was recoded as 6 absences. Children who were never absent (scale value of 0) and children who were absent for 20 or more days of the school year (scale value of 5) were coded as being absent for 0 days and 20 days, respectively. For our first set of analyses (discussed in more detail below), we treat absenteeism as a continuous variable. Even though this variable is ordinal and based on six discrete options, prior simulation studies have shown these types of scales can be treated as continuous as long as they have four or more categories (Bentler & Chou, 1987).

In addition to looking at children’s school absences continuously measured, we also looked at a binary indicator of chronic absenteeism. Similar to prior studies using these data (Gottfried, 2014a, 2015), chronic absenteeism was defined as missing 11 or more days of the

school year. We selected this benchmark as opposed to other definitions of chronic absences (e.g., missing 10% of the school year, Balfanz & Byrnes, 2012) because teacher reports of children's school attendance were generally recorded in March of kindergarten and first grade, rather than at the end of the year. Thus, children who missed 11 to 19 days of school by March were likely at risk for being chronically absent by the end of the year.

**Children's early school arrangements.** At the start of kindergarten, parents indicated whether their child attended a center-based program during the prior school year, which included day care centers, nursery school, prekindergarten programs, and Head Start. Although these center-based programs include a variety of experiences, what they have in common is that they are formal and educational in nature. Approximately 58% of all children who participated in the ECLS-K: 2011 were reported to have attended a center-based program during the year before kindergarten. The remaining 42% of children were classified as being cared for by an informal care provider (e.g., parental care, relative care, and family childcare; for similar classifications see, Ansari, 2018; Iruka, Gardner-Neblett, Matthews, Winn, 2014; Tucker-Drob, 2012).

As part of the parent interviews, parents were also asked to indicate whether their child attended center-based care before or after school during the kindergarten year. Of the study children, 18% were reported to have attended center-based care during the kindergarten year and the remaining 82% did not participate in center-based care before or after the school day.

In addition to reports of children's experiences in center-based care, children were classified as attending either a full- (82%) or part-day (18%) kindergarten program. If children were enrolled in part-day kindergarten, they were further classified into morning or afternoon classes. Similar to other research in this area (e.g., Votruba-Drzal et al., 2008), children in morning or afternoon kindergarten programs were classified as being in part-day kindergarten for

the majority of our analyses. It is important to note that center-based care participation in the kindergarten year was *not* a more common experience among families whose children were in part-day kindergarten (i.e., roughly 17-18% of children in part *and* full-day kindergarten attended center-based care during the kindergarten year).

Finally, we used the information discussed above (i.e., children's enrollment in center-based care at ages 4 and 5 and enrollment in full-day kindergarten) to classify children into the number of arrangements they experienced at ages 4 and 5. In total, roughly 8% of children experienced none of the above arrangements, 40% experienced one arrangement, another 40% experienced two arrangements, and 12% of children experienced all three arrangements.

**Covariates.** To reduce the possibility of spurious associations and selection into the different types of early school arrangements, all models adjusted for a full set of child- and family-level characteristics that were drawn from the kindergarten wave of data collection. These covariates were informed by developmental and biocological theory (Bronfenbrenner & Morris, 2006) and prior studies on why children are absent from school (Chang & Davis, 2015). At the child-level, we adjusted for: age at kindergarten entry, gender, race/ethnicity, home language, disability status, premature birth status, insurance coverage (0 = *no*, 1 = *yes*), health (as reported by parents; 1 = *poor or fair* to 4 = *excellent*), regular sleep time (0 = *no*, 1 = *yes*), the number of days per week children ate breakfast and dinner with their family, television viewing time before and after school (in minutes), computer usage, receipt of medical care (doctor and dentist visits), and children's school sector (public or private school).

Parent- and family-level covariates included: parents' years of education, age, marital status, health (1 = *poor* to 5 = *excellent*), age parents immigrated to the United States, employment status (full time, part time, unemployed), job prestige (the job prestige of parents not in the labor

force were coded as 0; see also Turney & Kao, 2009), depressive symptoms (as measured with the Center for Epidemiologic Studies Depression Scale [CES-D]; Radloff, 1977), the number of children in the household, the number of siblings attending the same school as the study child, household income, household food security status (a combination of 18 adult and child experiences; 1 = *food secure* [raw scores of 0-2], 2 = *low food security* [raw scores of 3-7], 3 = *very low food security* [raw scores of 8 or more]), receipt of TANF and food stamps, residential instability since the birth of child, number of children's books in the home, school involvement (e.g., PTA/PTO meetings, parent teacher conference), engagement in cognitive stimulation (e.g., telling stories, singing songs), frequency of spanking, neighborhood safety (0 = *not safe or somewhat safe for child to play outside*, 1 = *very safe for child to play outside*), and urbanicity.

### **Analytic Strategy**

All analyses were estimated within a regression framework in the *Mplus* program (version 7; Muthén & Muthén, 1998-2013). Our models implemented robust standard errors clustered at the school level to adjust for the nesting of children in schools (see also, Duncan, Jenkins, Auger, Burchinal, Domina, & Bitler, 2015; Weiland & Yoshikawa, 2014) and included longitudinal sampling weights to adjust for bias that may arise due to cross-wave attrition and ensure that the data were nationally representative. To address issues of missing data, which ranged from 0-25%, we used full information maximum likelihood estimation (FIML; Schafer & Graham, 2002), which fits the covariance structure model to the data for each individual study participant. Because all continuous predictors and continuous outcomes have been standardized, coefficients can be interpreted as the standard deviation change in children's school absences as a function of either their enrollment in different early school arrangements or the various covariates (i.e., effect sizes or Cohen's *d*). Our analyses also implemented maximum likelihood

estimation with robust standard errors to safeguard against any violations of normality.

Our focal analyses were estimated in a series of steps. In the first model, which investigates the links between the three types of school arrangements and children's school absences, we included dummy indicators for children's participation in: (a) center-based care in preschool; (b) center-based care in kindergarten; and (c) full-day kindergarten to assess the main effects of these different types of school arrangements. We then estimated models that considered the ramifications of having different numbers (i.e., 0, 1, 2 or 3) and combinations (i.e., two- and three-way interactions) of these arrangements for children's school absences. Analogous linear probability models were then estimated for the binary indicator of chronic absenteeism. As a precaution, we also estimated logistic regression models for these binary outcomes and all findings were substantively the same as those reported below (results are available upon request from the authors).

## **Results**

We begin with brief descriptives of children's school absences and the correlates of school absences in kindergarten and first grade. We then turn to a discussion of the additive and multiplicative benefits of children's early school experiences for their school attendance.

### **Descriptives and Correlates of Absenteeism in Kindergarten and First Grade**

During the kindergarten year children across the nation missed roughly 5.75 days of school ( $SD = 4.59$ ) and 12% of children were considered to be chronically absent. During the following year, however, children missed 4.96 days of school ( $SD = 4.22$ ) and only 9% of children were considered to be chronically absent. At the population level, this means that roughly 460,000 kindergartners were chronically absent in 2010-2011 and roughly 345,000 first graders were chronically absent in 2011-2012 (estimates were generated with the population

level weights in the ECLS-K). Thus, the majority of students had a good a school attendance record during the early elementary school years and there was some empirical evidence to suggest that children were less likely to be absent (0.79 days fewer days) and chronically absent (3 percentage points less likely) in first grade than in kindergarten ( $ps < .001$ ).

Although these estimates of school absences in the early elementary school years are not necessarily large at the individual child-level, when translated into instructional days missed at the population level, this means that kindergartners across the country missed roughly 22 million days of school in 2010-2011 and first graders missed approximately 19 million days of school in 2011-2012 (estimates were generated by taking the average school days missed in kindergarten and first grade and multiplying those averages by the ECLS-K weighted population sample size).

Having established the national trends in school absences, and as a step toward our focal research objectives, we next considered the child- and family-level correlates of children's absenteeism and chronic absenteeism in kindergarten and first grade. Below, we discuss the predictors that were fairly consistent across outcomes and school grades (full results are available in Table 2). Overall, Black children, non-English speakers, healthy children, and children of more educated parents and whose parents worked outside of the home were *less* likely to be absent (or chronically absent) in kindergarten and first grade. In contrast, children who received inadequate medical care, daily computer users, and children who experienced food insecurity and/or whose families received food stamps were more likely to miss time from school. Children who experienced greater cognitive stimulation at home were also *more* likely to be absent and chronically absent in kindergarten and first grade (for effect sizes see Table 2).

### **Program Participation and Absenteeism**

Moving onto our focal research objectives, which focused on the implications of

children's early school arrangements for their school absences, we found that children who attended center-based care in preschool (effect sizes = 6-7% of a *SD*) and kindergarten (effect sizes = 11-14% of a *SD*) were less likely to be absent in kindergarten and first grade (see left hand panel of Table 2). Translated into day of school missed, this means that children who attended center-based care in preschool missed approximately 0.55 fewer days of school (0.25 in kindergarten and 0.30 in first grade) and children who attended center-based care in kindergarten missed roughly 1.10 fewer days of school (0.50 in kindergarten and 0.60 in first grade). And although no differences emerged among children who attended part-day kindergarten programs in the morning or afternoon, children who attended full-day classrooms were *more* likely to be absent in kindergarten (effect size = 7% of a *SD* or roughly 0.34 days of school), but *less* likely to be absent in first grade (effect size = 8% of a *SD* or roughly 0.32 days of school) than children who attended part-day kindergarten programs.

Findings for chronic absenteeism followed a similar pattern: children who attended center-based care in preschool were two to three percentage points less likely to be chronically absent in kindergarten and first grade and, again, no differences emerged in rates of chronic absenteeism for children who attended part-day programs in the morning as compared with the afternoon (see right hand panel of Table 2). Unlike children's absenteeism from school when measured continuously, children who participated in full-day programs were not more (or less) likely to be chronically absent than children in part-day programs. However, as can be seen in Table 2, the point estimates were in the expected direction.

### **Multiple Years of Arrangements**

Our next set of analyses considered the multiplicative benefits of early school arrangements for children's school attendance. Results from our two (CBC in preschool and

FDK) and three-way (CBC in preschool X CBC in kindergarten X FDK) interaction models yielded no evidence of moderation (see Table 3). That is, no specific combination of early school arrangements across the preschool and kindergarten years was most beneficial in reducing children's school absences. Rather, children who experienced *more* arrangements in general were *less* likely to be absent and chronically absent in kindergarten and first grade. For example, children who experienced all three early school arrangements were absent less frequently in kindergarten (effect size = 13% of *SD*) and first grade (effect size = 33% of *SD*) than children who experienced zero arrangements and these children were also four to seven percentage points less likely to be chronically absent (see Table 3). In terms of days of school missed, this means that children who experienced all three early school arrangements missed roughly two fewer days of school than children who experienced none of the above arrangements (0.60 days in kindergarten and 1.40 days in first grade). When taken together, this tiered structure revealed that children who experienced more early educational arrangements were generally absent less frequently and these benefits were considerably larger in first grade than in kindergarten.

### Discussion

Our study considered whether attending different early educational programs might be linked to absenteeism during the first two years of elementary school. Previous research had considered the role of center-based care on absenteeism during kindergarten (Gottfried, 2015) or the role of full-day kindergarten on absenteeism for students with disabilities (Gottfried, 2017). Both of these studies examined short-term outcomes through the end of kindergarten. Ours, however, was the first to examine the role of center-based care in conjunction with attending full- versus part-day kindergarten for both short- and long-term attendance outcomes among the general population of students. Therefore, our study extended existing research in this area in

two meaningful capacities. First, we addressed which early settings—and in what combination—might link to students' absences. Second, we looked at the associations between early school settings and both kindergarten *and* first grade absences. This type of empirical inquiry is important given that both years witness the highest rates of absences out of any period in elementary school (Balfanz & Byrnes, 2012). As students across the nation are beginning their educational careers with staggering amounts of missed days from school, it is of growing importance that researchers, practitioners, and policymakers alike begin to examine both short- and long-term effects in the early school years. There are several noteworthy findings from our investigation that we discuss below.

First, and as mentioned above, prior research has established that attending center-based care during the preschool year is associated with fewer absences in kindergarten (Gottfried, 2015). The present study demonstrates that a longer-term association also surfaces, given that children in first grade also had fewer absences from attending center-based care in prekindergarten. Notably, the prekindergarten center-based care effect sizes, although small, are similar in magnitude for both kindergarten and first grade days absent and chronic absence outcomes. For example, the benefits of center-based care for school absences decreased in size by only 8% ( $0.061\ SDs / 0.066\ SDs = 0.92$ ) between kindergarten and first grade and increased by 21% ( $.019\ SDs \times 1.21 = .023\ SDs$ ) for chronic absenteeism. To our knowledge, our study is the first to demonstrate that the effect of attending center-based care in preschool might have sustained effects for students' school attendance, which is of note given the larger pattern of convergence that occurs shortly after kindergarten for most academic outcomes of interest that result from center-based care participation (Phillips et al., 2017; Yoshikawa et al., 2013). These findings, are however, in line with other studies that suggest that center-based care participation

is associated with longer-term benefits in outcomes such as grade retention and special education assignment (e.g., Gormley, Phillips, & Anderson, 2017; Muschkin, Ladd, & Dodge, 2015). Thus, what our results indicate is that participation in center-based care at age 4 allows children to seize the opportunities provided to them in kindergarten and first grade by actually being present in the classroom, which in turn can have long-term cascading effects.

Second, it was noteworthy that the effects sizes were also similar in magnitude both in kindergarten and first grade for center-based care participation. Therefore, just like center-based care during the preschool year, there appears to be a similar conclusion here—attending formal care early on in the life course could have positive implications for reducing school absenteeism in the earliest years of elementary school when absenteeism is at its highest. In fact, examining effect sizes alone might underscore the great importance of center-based care in kindergarten on absenteeism, given their slightly larger effect sizes in the days absent model. It is important to emphasize that center-based care participation was *not* used solely in conjunction with part-day kindergarten. An equal share of children in part- and full-day kindergarten programs across the country participated in center-based care during the same year, suggesting that researchers need to think more carefully about children's before and after school arrangements during the kindergarten year (see also: Claessens, 2012).

Third, as for full- versus part-day kindergarten, the results for kindergarten absences are not quite surprising. In the only known study on absenteeism in full-day kindergarten, Gottfried (2017) finds that children with disabilities in full-day kindergarten had more absences and were more likely to be chronically absent by the end of the school year. In our study here on children in the general population, we see the same pattern for kindergarten absences. As discussed above, some research suggests that children in full-day programs tend to complain more about

school, are upset about having to go school, and are more likely to pretend to be sick to stay home from school (Hausken, Brimhall & Pollack, 2001). These negative attitudes about school may materialize as refusal to attend school (i.e., absenteeism). There is likely no single explanation for this, though the stress associated with the longer day at school might be one factor (Guddemi, 2010; Logue, 2007). That being said, our findings build on prior studies and suggest that there is a reversal over time: in first grade, children who had a full-day kindergarten experience tended to have *fewer* absences. Thus, these longer-term associations appear to be aligned with the long-term benefits of attending center-based care at age 4 or in kindergarten.

When taken together, the interpretation of these first three findings underscore the importance of formal early educational programs and opportunities on longer-term school attendance. These educational experiences might help ease the transition to school for both children and families. For the child, being in formal settings might provide an opportunity to develop positive school-going attitudes and routines by leaving the home each day (Ladd & Price, 1987), which maps onto fewer instances of school avoidance (i.e., pretending to be sick) and fewer school absences (Gottfried, 2014a; Ekstrom et al., 1986; Newmann, 1981). Prior research has also suggested that children who attend a formal prekindergarten program at age 4 have a better mastery of the transition into kindergarten (Ladd & Price, 1987). Our findings reported here might suggest that this mastery might extend to school attendance. As for parents, having children in formal educational settings during these early years might help them establish and maintain school-going routines and logistics—both of which are significant predictors of school attendance (Chang & Romero, 2008).

Given this potential mechanism of being in or sending children to center-based care and full-day kindergarten programs, our fourth and final finding gains greater clarity. More

specifically, our fourth finding suggests that more early educational opportunities are better. That is, children in three formal programs had fewer absences than children in two and so forth.

Interestingly, however, which combination of programs the child attended did not matter in regards to reducing absenteeism. What this suggests is that when it comes to school absences, it is the mere exposure to numerous formal programs that might help to develop school-going routines. In the framework of school transitions, multiple settings during the early years provides multiple opportunities for development and reinforcement for both children and their parents.

Given these findings, there are several implications for both policy and practice. First, the short-term academic benefits of attending center-based care (Phillips et al., 2017; Yoshikawa et al., 2013) as well as full-day kindergarten (Cannon, Jacknowitz, & Painter, 2006; Gibbs, 2014; Votruba-Drzal et al., 2008) are well established. The findings reported herein underscore that the importance of these programs extend beyond testing and academics to an often-overlooked early schooling outcome—namely absenteeism. Second, given that good school attendance for children in these programs involves families, one potential intervention point would be at the parent level. As seen by the predictors of school absences (both here and the existing literature), having a high rate of absences in elementary school is somewhat indicative of at-risk family environments (Sheldon, 2007) in which parents are absent from, unaware of, or uninvolved in their children's schooling (Catsambis & Beveridge, 2001; Fan & Chen, 2001; Jeynes, 2003; McNeal, 1999; Muller, 1993). That is, parents may not understand the negative consequences of missing school during the early years; they may believe myths that their children will catch up or that attendance in school is only important in later grades. Outside of the area of school attendance, other researchers have documented the educational benefits of programs that improve the relationship between parents and schools (Sheldon, 2007). Therefore, in determining

how to allocate resources to reduce absenteeism, it appears that one potential yet under-explored avenue for reducing child truancy may be through parent education and awareness (see also: Robinson, Lee, Dearing, & Rogers, 2017).

Finally, center-based care and full-day kindergarten are not universal. As shown in this study, roughly 8% of children experienced neither and these children tended to have the highest rate of school absences. Therefore, it is important to determine how to promote both short- and long-term school attendance for children who do not attend these early programs. Unfortunately, these parents may represent those who are most unaware of the consequences of school absences, and thus, educators should clearly communicate with parents to make sure that parents understand that education—and by extension, absenteeism—during the early years matters (Katz, Johnson, & Adams, 2016). Indeed, recent randomized control trials of low-cost interventions in Philadelphia (Rogers & Feller, 2017) and California (Robinson et al., 2017) and pilot interventions in Pittsburgh (Smythe-Leistico & Page, 2018) have found that simple reminders to parents regarding their children's school attendance can reduce school absences in elementary school, especially when targeted to children who were most at-risk, such as the children in our study who had little school experience. Thus, a combination of educational services and interventions is likely to be most effective in curtailing children's school absences.

As with any study, the results of this investigation need to be interpreted in light of a few important limitations. Primary, the data we used to estimate school absences were based on six discrete options as reported by teachers in March of kindergarten and first grade. A caveat to this measurement limitation, however, is that studies done with the ECLS-K: 1998 cohort, which had access to administrative records, show similar rates of school absences in kindergarten at the end of the school year (Gershenson et al., 2017). More specifically, Gershenson and colleagues

(2017) found that children missed roughly 0.89 days of school per month (7.98 absences/9 months of school) in kindergarten, which mirrors our findings of 0.88 absences per month (5.75 absences/6.5 months of school). Second, children's center-based experiences both in preschool and kindergarten were based on parent-report, which were not verified to ensure that children did in fact attend a center-based program. Nonetheless, parent report of children's center-based experiences have been extensively used in the past for studying preschool education (e.g., Ansari, 2018; Bassok, 2010; Crosnoe, 2007; Loeb et al., 2007; Magnuson et al., 2007).

Third, although we controlled for a rich set of child- and family-level covariates, these data are correlational in nature and, therefore, caution is warranted when interpreting our findings. Fourth, the ECLS-K dataset did not contain absence information for children in prekindergarten. Although the above is not necessarily a limitation that can be addressed with extant data, it does call for future data collection efforts to consider the entire early educational pipeline, starting before formal schooling and extending into elementary school and beyond (see also: Ansari & Purtell, 2017, 2018; Connolly & Olson, 2012; Ehlich et al., 2014; Fuhs et al., 2018). Having such data would help provide even more detail on what programs matter, when programs matter most, and how programs can reduce children's school absences. Finally, research regarding the conditions under which early educational programs have positive effects on school attendance and the assumed intervening mechanisms requires continued attention.

With these limitations and future directions in mind, the results of the current investigation contribute to our understanding of whether and in what combination formal early educational programs have implications for children's longer-term school attendance. Early school absenteeism clearly has negative ramifications for both short- and long-term school success (Alexander et al., 1997; Ansari & Purtell, 2017, 2018; Connolly & Olson, 2012;

Dryfoos, 1990; Ehrlich et al., 2018; Finn, 1993; Gottfried, 2009, 2010; Morrissey et al., 2014; Rumberger, 1995). Therefore, this study presents important and promising evidence as to how to best set our nation's youngest schoolchildren on the right track from the very start of school.

### **Compliance with Ethical Standards**

**Conflict of interest:** The authors declare that they have no conflict of interest.

**Ethics approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.

**Access to data:** All data are publicly available through the National Center for Educational Statistics.

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Table 1.  
*Weighted descriptive statistics for ECLS-K 2011 study sample.*

Variable	Overall	Number of school arrangements				Sig. group difference
		Zero	One	Two	Three	
<i>School arrangements</i>						
Center-based care in preschool	0.58	0.00	0.20	0.94	1.00	***
Center-based care in kindergarten	0.18	0.00	0.02	0.13	1.00	***
Full-day kindergarten	0.82	0.00	0.78	0.94	1.00	***
Part-day kindergarten AM	0.11	0.60	0.13	0.04	0.00	***
Part-day kindergarten PM	0.07	0.40	0.08	0.03	0.00	***
<i>School absences</i>						
Number of absences in kindergarten	5.75 (4.59)	5.78 (4.69)	5.96 (4.74)	5.68 (4.49)	4.89 (3.94)	***
Zero	0.04	0.04	0.04	0.03	0.05	
Two and a half	0.46	0.47	0.44	0.47	0.52	***
Six	0.26	0.23	0.26	0.26	0.28	
Nine	0.12	0.13	0.12	0.12	0.09	**
Fifteen	0.10	0.10	0.10	0.09	0.05	***
Twenty	0.03	0.03	0.03	0.02	0.02	
Chronic absences in kindergarten	0.12	0.13	0.14	0.12	0.07	***
Number of absences in first grade	4.96 (4.22)	5.73 (4.67)	5.13 (4.37)	4.94 (4.12)	4.14 (3.49)	***
Zero	0.06	0.03	0.05	0.06	0.07	***
Two and a half	0.53	0.49	0.53	0.53	0.60	***
Six	0.23	0.26	0.22	0.23	0.22	
Nine	0.09	0.10	0.09	0.10	0.06	**
Fifteen	0.07	0.10	0.08	0.06	0.04	***
Twenty	0.02	0.03	0.02	0.02	0.01	*
Chronic absences in first grade	0.09	0.13	0.10	0.08	0.05	***
<i>Child characteristics</i>						
Age at kindergarten entry	66.53 (4.21)	65.96 (4.37)	66.63 (4.16)	66.74 (4.22)	66.22 (4.30)	***
Male	0.51	0.53	0.50	0.51	0.52	
White	0.52	0.61	0.55	0.56	0.51	***
Black	0.13	0.05	0.13	0.13	0.20	***
Latino	0.25	0.24	0.24	0.21	0.18	***
Asian/Other	0.10	0.11	0.08	0.10	0.11	**
Home language is English	0.83	0.86	0.83	0.87	0.93	***
Diagnosed with disability	0.20	0.14	0.20	0.21	0.18	***

*Table 1 continued on next page*

Table 1 continued

Variable	Overall	Number of school arrangements				Sig group difference
		Zero	One	Two	Three	
Insurance coverage	0.95	0.96	0.94	0.96	0.97	***
Health (1=fair/poor, 4= excellent)	3.42 (0.78)	3.51 (0.73)	3.40 (0.80)	3.40 (0.80)	3.49 (0.71)	***
Regular sleep time	0.92	0.91	0.92	0.93	0.93	
Eats dinner with family (days)	5.79 (1.67)	5.69 (1.68)	5.83 (1.64)	5.82 (1.61)	5.70 (1.56)	*
Eats breakfast with family (days)	3.89 (2.46)	4.35 (2.45)	3.97 (2.46)	4.00 (2.45)	3.63 (2.41)	***
Television viewing before 8AM (minutes)	11.54 (22.58)	11.11 (22.20)	11.90 (24.70)	11.12 (20.06)	11.70 (24.55)	
Television viewing after 6PM (minutes)	50.28 (44.26)	45.60 (40.68)	50.58 (45.13)	50.08 (44.26)	51.86 (45.96)	
Born two weeks premature	0.20	0.16	0.19	0.21	0.20	*
Does not have a computer at home	0.25	0.21	0.27	0.22	0.22	***
Uses a computer every day	0.11	0.12	0.12	0.11	0.08	**
Attends a public school	0.89	0.92	0.92	0.87	0.75	***
Last visited a doctor (months)	8.05 (3.32)	8.63 (4.01)	8.02 (3.24)	7.96 (3.14)	8.12 (3.36)	***
Visited dentist in the last year	0.89	0.89	0.88	0.91	0.93	***
Sibling attends the same school	0.52	0.50	0.55	0.53	0.41	***
<b>Parent and household characteristics</b>						
Parent years of education	13.76 (2.48)	13.99 (2.34)	13.49 (2.41)	14.02 (2.43)	14.74 (2.18)	***
Parent age	34.01 (6.70)	34.38 (6.28)	33.39 (6.59)	34.44 (6.79)	34.58 (6.65)	***
Parent married	0.69	0.78	0.68	0.72	0.65	***
Parent health (1=poor, 5= excellent)	3.84 (0.96)	3.87 (0.93)	3.85 (0.98)	3.83 (0.96)	3.92 (0.93)	
Parent age immigrated	4.21 (8.67)	3.27 (7.44)	3.84 (8.27)	3.31 (7.90)	2.32 (6.62)	***
Mother employed full time	0.43	0.34	0.38	0.40	0.77	***
Mother employed part time	0.21	0.25	0.22	0.22	0.15	***
Mother unemployed	0.36	0.41	0.40	0.38	0.08	***
Mother job prestige	31.43 (22.28)	29.24 (22.86)	28.61 (22.03)	31.51 (22.85)	44.32 (15.10)	***
Mother depressive symptoms	1.36 (0.40)	1.35 (0.41)	1.36 (0.40)	1.36 (0.38)	1.35 (0.41)	
Number of children in household	2.51 (1.12)	2.62 (1.08)	2.63 (1.16)	2.50 (1.09)	2.08 (0.90)	***
Household income	10.54 (5.45)	11.79 (4.88)	10.25 (5.34)	11.07 (5.43)	12.04 (5.31)	***
Household food secure	0.87	0.88	0.86	0.89	0.91	***
Household low food security	0.10	0.11	0.11	0.09	0.07	***
Household very low food security	0.03	0.02	0.02	0.03	0.02	
Household received TANF	0.05	0.05	0.06	0.05	0.06	**
Household received Food stamps	0.27	0.20	0.29	0.27	0.21	***
Number of children's books in home	88.25 (136.84)	84.56 (94.60)	81.74 (120.91)	96.01 (155.57)	90.78 (145.78)	***
Parent school involvement	0.55 (0.21)	0.54 (0.21)	0.54 (0.21)	0.58 (0.20)	0.57 (0.19)	***

Table 1 continued on next page

*Table 1 continued*

Variable	Overall	Number of school arrangements				Sig group difference
		Zero	One	Two	Three	
Parent engagement in cognitive stimulation	2.93 (0.47)	2.94 (0.46)	2.92 (0.48)	2.94 (0.46)	2.90 (0.44)	
Parent use of spanking	1.22 (1.02)	1.07 (0.58)	1.24 (1.03)	1.20 (1.00)	1.28 (1.07)	***
Neighborhood is safe	0.71	0.77	0.72	0.73	0.75	*
Residential moves since birth	1.98 (1.11)	1.97 (1.11)	1.97 (1.10)	1.97 (1.11)	2.01 (1.13)	
City	0.32	0.20	0.29	0.31	0.41	***
Suburb	0.33	0.51	0.32	0.31	0.33	***
Town	0.12	0.07	0.12	0.13	0.07	***
Rural	0.24	0.22	0.27	0.25	0.18	***
Proportion of sample	1.00	0.08	0.40	0.40	0.12	

*Notes.* All variables have been weighted to be nationally representative. Proportions might not sum to 1.00 due to rounding. Significant group differences were determined with an ANOVA.

*Multivariate results of school arrangements predicting children's school absences.*

	Absenteeism		Chronic Absenteeism	
	Kindergarten	First grade	Kindergarten	First grade
<b><i>School arrangement</i></b>				
Center-based care in pre-K	-0.066 ** (0.025)	-0.061 * (0.028)	-0.019 * (0.008)	-0.023 ** (0.008)
Center-based care in kindergarten	-0.109 *** (0.033)	-0.139 *** (0.033)	-0.025 * (0.011)	-0.023 ** (0.009)
Full day kindergarten vs. half day	<b>0.074 *</b> <b>(0.037)</b>	<b>-0.077 *</b> <b>(0.039)</b>	0.011 (0.011)	-0.019 (0.011)
Half day AM vs. Half day PM <sup>a</sup>	0.007 (0.055)	-0.067 (0.060)	-0.006 (0.015)	-0.012 (0.018)
<b><i>Child characteristics</i></b>				
Age at kindergarten entry	-0.040 ** (0.013)	-0.007 (0.013)	-0.005 (0.004)	-0.001 (0.004)
Male	-0.052 * (0.022)	-0.032 (0.022)	-0.003 (0.007)	-0.007 (0.006)
Black	-0.140 ** (0.045)	-0.165 *** (0.045)	<b>-0.008</b> <b>(0.014)</b>	<b>-0.046 ***</b> <b>(0.012)</b>
Latino	0.016 (0.040)	0.006 (0.042)	0.009 (0.012)	0.010 (0.011)
Asian/Other	0.050 (0.043)	0.022 (0.053)	0.030 * (0.014)	0.015 (0.013)
Home language is English	0.136 * (0.058)	0.269 *** (0.052)	0.031 (0.020)	0.074 *** (0.014)
Diagnosed with disability	0.042 (0.030)	0.050 (0.030)	0.011 (0.010)	-0.001 (0.009)
Insurance coverage	-0.067 (0.066)	0.001 (0.065)	-0.031 (0.024)	-0.007 (0.019)
Health (1=fair/poor, 4= excellent)	-0.099 *** (0.015)	-0.063 *** (0.015)	<b>-0.027 ***</b> <b>(0.005)</b>	<b>-0.011 *</b> <b>(0.005)</b>
Regular sleep time	-0.115 * (0.054)	-0.021 (0.050)	<b>-0.046 *</b> <b>(0.018)</b>	<b>0.004</b> <b>(0.013)</b>
Eats dinner with family (days)	-0.011 (0.013)	-0.019 (0.013)	-0.004 (0.004)	-0.005 (0.004)
Eats breakfast with family (days)	0.010 (0.012)	-0.005 (0.014)	-0.001 (0.004)	-0.005 (0.004)
Television viewing before 8AM	-0.008 (0.014)	-0.032 ** (0.012)	0.000 (0.005)	-0.005 (0.003)
Television viewing after 6PM	0.022 (0.013)	0.025 (0.015)	0.004 (0.004)	0.005 (0.004)
Born two weeks premature	0.048 (0.032)	0.044 (0.030)	0.007 (0.011)	0.012 (0.009)

*Table 2 continued on next page*

Table 2 continued.

	Absenteeism		Chronic Absenteeism	
	Kindergarten	First grade	Kindergarten	First grade
Does not have a computer at home	-0.028 (0.030)	-0.044 (0.031)	-0.012 (0.010)	-0.014 (0.009)
Uses a computer every day	0.096 * (0.038)	0.134 *** (0.041)	0.024 (0.013)	0.033 ** (0.012)
Attends a public school	-0.036 (0.044)	-0.052 (0.047)	-0.012 (0.013)	-0.017 (0.012)
Last visited a doctor (months)	-0.029 * (0.014)	-0.041 *** (0.012)	-0.007 (0.004)	-0.011 *** (0.003)
Visited dentist in the last year	-0.108 *** (0.045)	-0.133 ** (0.046)	-0.036 * (0.016)	-0.034 ** (0.013)
Sibling attends the same school	-0.060 * (0.027)	-0.042 (0.029)	-0.011 (0.009)	-0.003 (0.008)
<b>Parent and household characteristics</b>				
Parent years of education	-0.014 (0.016)	-0.046 ** (0.016)	-0.009 (0.005)	-0.011 * (0.004)
Parent age	-0.021 (0.014)	-0.005 (0.017)	0.001 (0.005)	0.004 (0.005)
Parent married	-0.059 (0.033)	-0.013 (0.036)	-0.013 (0.011)	-0.005 (0.011)
Parent health (1= <i>poor</i> , 5= <i>excellent</i> )	-0.017 (0.014)	-0.029 (0.015)	0.004 (0.005)	0.009 * (0.004)
Parent age immigrated	-0.034 (0.023)	-0.014 (0.022)	-0.005 (0.008)	0.007 (0.006)
Mother employed full time	-0.140 ** (0.050)	-0.170 *** (0.049)	-0.024 (0.016)	-0.031 * (0.013)
Mother employed part time	-0.091 (0.048)	-0.120 * (0.052)	-0.013 (0.016)	-0.030 * (0.014)
Mother job prestige	-0.024 (0.021)	-0.002 (0.022)	-0.008 (0.007)	-0.007 (0.006)
Mother depressive symptoms	0.026 (0.014)	0.007 (0.013)	0.005 (0.005)	0.000 (0.004)
Number of children in household	-0.015 (0.015)	-0.046 ** (0.016)	-0.003 (0.005)	-0.009 * (0.004)
Household income	-0.016 (0.021)	-0.009 (0.020)	-0.008 (0.007)	-0.010 (0.006)
Household food secure	-0.165 (0.102)	-0.219 * (0.100)	-0.060 (0.037)	-0.060 * (0.030)
Household low food security	-0.219 * (0.107)	-0.179 (0.105)	-0.087 * (0.038)	-0.044 (0.032)
Household received TANF	0.045 (0.066)	0.107 (0.077)	0.023 (0.023)	0.036 (0.024)

Table 2 continued on next page.

Table 2 continued.

	Absenteeism		Chronic Absenteeism	
	Kindergarten	First grade	Kindergarten	First grade
Household received Food stamps	0.155 *** (0.041)	0.149*** (0.041)	0.038 ** (0.014)	0.021 (0.012)
Number of children's books in home	0.018 (0.011)	0.017 (0.015)	0.003 (0.004)	0.003 (0.004)
Parent school involvement	-0.057 *** (0.014)	-0.022 (0.016)	-0.013 ** (0.005)	-0.002 (0.004)
Parent engagement in cognitive stimulation	0.046 *** (0.012)	0.033 * (0.014)	0.015 *** (0.004)	0.008 * (0.004)
Parent use of spanking	-0.005 (0.015)	-0.004 (0.014)	0.001 (0.006)	0.001 (0.004)
Neighborhood is safe	0.015 (0.031)	-0.020 (0.030)	0.004 (0.010)	0.009 (0.008)
Residential moves since birth	0.026 (0.014)	0.033 * (0.014)	0.003 (0.005)	0.003 (0.004)
City	-0.084 (0.044)	-0.019 (0.043)	-0.024 (0.013)	0.004 (0.011)
Suburb	-0.059 (0.040)	-0.010 (0.040)	-0.016 (0.012)	0.000 (0.011)
Town	<b>-0.074</b> <b>(0.058)</b>	<b>0.089</b> <b>(0.058)</b>	-0.004 (0.018)	0.001 (0.015)

Notes. <sup>a</sup> Half day AM versus PM estimates were generated from a separate model. Bolded coefficients indicate significant differences across kindergarten and first grade at  $p < .05$ .

\*\*\*  $p < .001$ . \*\*  $p < .01$ . \*  $p < .05$ .

Table 3.

*Multivariate results of school arrangements predicting children's school absences.*

	Absenteeism		Chronic Absenteeism	
	Kindergarten	First grade	Kindergarten	First grade
<i>Number of school arrangements</i>				
Zero versus:				
One	<b>0.008</b> (0.055)	<b>-0.181 **</b> (0.067)	-0.004 (0.017)	-0.035 (0.021)
Two	<b>-0.031</b> (0.054)	<b>-0.224 ***</b> (0.066)	-0.017 (0.017)	-0.056 ** (0.020)
Three	<b>-0.125 *</b> (0.061)	<b>-0.328 ***</b> (0.071)	-0.044 * (0.019)	-0.070 *** (0.021)
One versus:				
Two	-0.038 (0.028)	-0.043 (0.030)	-0.013 (0.009)	-0.021 ** (0.009)
Three	-0.132 *** (0.041)	-0.146 *** (0.041)	-0.039 ** (0.013)	-0.035 *** (0.010)
Two versus:				
Three	-0.094 * (0.039)	-0.104 ** (0.038)	-0.026 * (0.013)	-0.014 (0.010)
<i>Interactive effects</i>				
CBC in pre-K X Full day K	0.033 (0.057)	0.096 (0.073)	0.000 (0.018)	0.005 (0.022)
CBC in pre-K X CBC in K X Full day K	-0.032 (0.190)	-0.102 (0.164)	-0.021 (0.060)	-0.017 (0.045)

*Notes.* Bolded coefficients indicate significant differences across kindergarten and first grade at  $p < .05$ .

CBC = center-based care. K = kindergarten.

\*\*\*  $p < .001$ . \*\*  $p < .01$ . \*  $p < .05$ .